The Builder.

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"DO pray tell me exactly how to make our house dry." "How shall we prevent the damp destroying the wood linings where there are any against our church walls, and producing ugly stains where there are none?" "Be so kind as to explain to us clearly how we may prevent our drawing-room chimney from smoking and spoiling the decorations for which we have just now paid a hundred and fifty pounds." "Please give me in few words, and not technically, a comprehensive system of ventilation for my residence."——Such, literally, are some of the requests which are forwarded to us week after week, and week after week again. Within these last six days we have received no less than four to the effect of the first of them alone.

There are usually no particulars,—without which even an approximate answer could not be given; and we are expected, empirically, to provide a cure applicable to any sort of case. Even if particulars be given, however, we are compelled to decline complying with such requests, for reasons which ought to be obvious. The general questions involved in such inquiries, as we recently had occasion to say with regard to heating, we have often discussed, and we shall, of course, continue to pursue the same system, but their application to special cases must be left to those who are enabled to examine the premises and weigh the various existing circumstances.

The endeavour to gain a cure for a damp or smoky house is not to be wondered at, the evils of either are so great and so obstinate. To obtain a perfectly dry house is no trifling achievement, and is seldom done. Consideration should more often be given to this, when building, than is now the case, especially in putting in the foundations and carrying up the underground work. When soft spongy bricks, or even good bricks or masonry, are placed on damp soil, forming a dry area, between the side of a wall and ground which may be against it, is of little use, because the damp will be absorbed from the bottom and rise, brick by brick (by capillary attraction), up the wall, until it reach a point where it is carried off by the external atmosphere or other influences. A layer of concrete under all the walls of a building (an excellent step in many other respects), will be found of great use in preventing the rise of damp. The bricks for the footings—if bricks are used—should be sound and dense, as slightly absorbent as they can be had; and the employment of cement, instead of mortar, in this position, is very desirable, and would make a scarcely appreciable difference in the cost of the structure. And, indeed, it may be said of good and bad work generally, that the expense of the former over the latter, considered as a per-centage on the whole cost of the building, would be in most cases trifling, and not to be weighed in any against the advantages which attend the former.

The ground, then, being kept off the external face of the wall by a dry area (formed, say, by a 4½-inch wall placed 4 inches from the face in question, and arranged so as to admit of the circulation of air), and the internal face freed from the soil, or protected from it, much would have been done towards preventing the evil so far as the bottom is concerned.

In many cases it is desirable to take out the ground from the area enclosed by the building, and substitute a rough sort of concrete, or dry brick rubbish grouted *in situ*, to keep down damp vapours; and in others to provide an additional precaution in the shape of a layer of impermeable matter in all the walls above the level of the soil. A layer of slates in cement is often used for this purpose. In some cases the horizontal surface of the wall is covered with a thin sheet of lead, but the duration of this for any length of time could not always be depended on.

In the case of a public building in Hull, where zinc, bedded in loam, and having the course of bricks immediately above it bedded in the same material, was thus employed, the zinc was found, when examined nine months after, at the time of introducing hot-water pipes, full of holes, and in a rapid state of oxidation. In many churches the earth lies against the walls to a higher level even than the floor of the church: as a matter of course, the walls are saturated with moisture,—the air within the church is affected by it; the woodwork in contact with the walls is rotted. Clearing away the earth so as to admit the sun and air to the walls, and forming a paved channel close against them, all round, so as to take away the surface-water, would often do much towards a cure.

There appears to be strong evidence in favour of the use of asphalte for the above purpose. A writer in M. Daly's *Revue Générale de l'Architecture*, quoted in the appendix to the second report of the Commissioners on the Fine Arts, says,—"In 1839 I superintended the construction of a house of three stories on the Lac d'Enghien. The foundation of the building is constantly in water, about 19½ inches below the level of the ground-floor. The entire horizontal surface of the external and internal walls was covered, at the level of the internal ground-floor, with a layer of Seyssel asphalte, less than half an inch thick, over which coarse sand was spread. Since the above date no trace of damp has shown itself round the walls of the lower story, which are for the most part painted in oil of a grey stone colour. It is well known that the least moisture produces round spots, darker or lighter, on walls so painted. Yet the pavement of the floor, resting on the soil itself, is only about 2½ inches above the external surface of the soil, and only 19½ inches at the utmost above that of the sheet of water."

In a lodge which the same writer built on a higher level, less exposed to moisture, the asphalte was not used, and there, he says, the walls are spotted with damp. And of another house built at the same period, he says,—"The area of the ground-floor of this second house is 2 feet 1½ inch above the level of the garden, and rests on sleeper-joists separated from the soil by an empty space of above 2 feet 7 inches in height, which is ventilated by numerous air-holes. Before this floor was laid, the horizontal surface of the foundation walls had been covered with a layer of Roman cement, about an inch thick. Notwithstanding all these precautions the damp has ascended the walls as high as 3 feet and some inches above the level of the flooring."*

To prevent a partial slip of the materials in the event of an unequal settlement of the foundations, where the layer of asphalte was used, rows of flints were incrusted midway in the thickness of the masonry (and covered by the asphalte), to form a sort of key.

Various compositions have been proposed at different times in our pages for preventing damp from penetrating enclosing walls. Amongst the prescriptions is one which some of our queriers, who were not then amongst our subscribers, may be glad to have. It came from a practical man, and is as follows:—

"Boil two quarts of tar with two ounces of kitchen grease, for a quarter of an hour, in an iron pot; add some of this tar to a mixture of slaked lime and powdered glass which have passed through a flour sieve and been dried completely over the fire in an iron pot, in the proportion of two parts of lime and one of glass, till the mixture becomes of the consistence of thin plaster. This cement must be used immediately after being mixed. It is not well to mix more at a time than will coat one square foot of wall, as it quickly becomes too hard for use, and continues to increase its hardness for three weeks. Great care must be taken to prevent any moisture from mixing with the cement. For a wall which is merely damp it will be sufficient to lay on one coating of cement about one-eighth of an inch thick, but should the wall be more than damp or wet, it will be necessary to coat it a second time. Plaster made of lime, hair, and plaster of Paris, may be afterwards laid on the cement. This cement when put in water will suffer neither an increase nor diminution in its weight."

The great point is, however, in all cases to take the evil at its source, and prevent the access of wet to the wall.

When dampness proceeds from deliquescence, nitrate of soda, &c., being present in the mortar,—washing the wall with a strong solution of alum has been tried with success.

In the report of the Fine Arts' Commissioners, to which we have already alluded, an account is given of the means of excluding damp from the internal surface of walls, not protected above the foundation in the way we have mentioned, by two French chemists, MM. D'Arcet and Thénard. To prepare the cupola of the Pantheon, Paris, for painting on, the face of the stones composing it was heated bit by bit, and a composition applied consisting of one part wax and three parts of oil, boiled with one-tenth of its weight of litharge. The absorption took place readily by means of heat, and the liquid penetrated the stone from a quarter to half-an-inch. The composition acquired solidity as it cooled, and became hard in six weeks or two months.

For ordinary purposes resin might be substituted for wax: the ingredients then are, one part of lithargised oil to two or three parts of resin. This composition has been employed with effect, with the aid of heat, to protect internal walls from damp. A remarkable instance of its successful application, related in the same memoir, is here added. "Two rooms on the basement story at the Sorbonne happen to be several feet lower, on the east and south sides, than the ground-level of the neighbouring houses. The walls of the two rooms on these sides are impregnated with saltpetre. Some years since it was thought advisable to coat them with stucco, in the hope of driving the saltpetre to the outside; but it penetrated the stucco, and re-appeared on its surface, producing so much damp that the plaster began to be decomposed, and the place became

* A similar instance of the inefficacy of cement for the purpose in question is recorded in the "Transactions of the Institute of British Architects," vol. I., p. 59.